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(54) IMPROVEMENTS IN OR RELATING TO TAPPING TEES FOR PLASTICS PIPES

(71) We, THE HEPWORTH IRON COMPANY LIMITED, a British Company, of Hazlehead, Stocksbridge, Sheffield, S30 5HG, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to tapping tees for plastics pipes, especially pipes for gases, but also applicable to pipes for liquids, and has for its object the provision of a tapping tee formed principally of plastics material and adapted to be connected to a plastics pipe that is under pressure, without leaving any debris in the pipe.

According to the present invention, a tapping tee for a plastics pipe comprises a saddle adapted for sealing engagement with the exterior of a plastic pipe, a body integral with the saddle, with a bore through the saddle to a counterbore through the body, a branch pipe receiving portion integral with the body adjacent the saddle, with a bore to the branch pipe receiving portion from the counterbore in the body, and a plug secured in the counterbore in the body between the bore to the branch pipe receiving portion and the end of the body remote from the saddle, the body and its integral parts and the plug being formed of plastics material, and the plug being provided with an axial bore with a screw-threaded counterbore at the end towards the saddle, together with a tubular friction cutter adapted to retain within itself a portion of pipe removed by it and having an external diameter slightly less than the diameter of the bore in the saddle, the cutter being carried coaxially on one side of a disc having a diameter slightly less than the diameter of the counterbore in the body and a spigot extending coaxially from the other side of the disc, the spigot being screw-threaded to correspond with the screw-threaded counterbore in the plug, and the spigot also being provided with means for enabling it to be rotated by a suitable disen-

gageable tool capable of extending through the bore in the plug.

With the saddle in sealing engagement with the exterior of a plastics pipe to be tapped, the cutter is engaged by the tool and rotated to cut through the pipe before the disc encounters the shoulder between the counterbore in the body and bore in the saddle, the portion of pipe removed being retained inside the cutter. The cutter is then lifted by the tool and rotated appropriately for the spigot to screw into the counterbore in the plug, so that after disengagement of the tool the cutter is held clear of the hole in the pipe and the bore in the saddle, and gas or liquid from within the plastics pipe flows through at least an annular gap between the cutter and the counterbore in the body, and through the bore to a branch pipe previously fitted and sealed to the branch pipe receiving portion. The spigot on the cutter, now being screwed into the counterbore in the plug, affords at least a substantial closing of the bore in the plug against escape of gas or liquid, especially if a sealing ring or washer encircles the spigot; however, it is preferable to provide the end of the body remote from the saddle with external screw-threading for a cap, preferably also of plastics material and preferably with a sealing ring to be compressed between the inside of the cap and the end of the body, to ensure a gas-tight joint thereafter, yet leaving it possible to gain access, e.g., should it be required that the cutter be advanced into sealing engagement with the hole in the plastics pipe to cut off the gas to the branch pipe while work is carried out in the branch pipeline, without interrupting the flow in the tapped pipe.

The disengageable tool for rotating and withdrawing the cutter does not form part of the claimed invention because various suitable tools are already available on the market. Thus the spigot may be provided with a non-circular socket, to receive a correspondingly shaped end of a spindle, the other end of which is adapted to be engaged by a wrench or brace, and the

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end of the spindle received in the socket in the spigot being fitted with a laterally protruding ball or being split so as to effect a frictional gripping engagement in the socket, such a spindle and wrench being well-known as part of a socket spanner kit.

The plug may be externally screw-threaded to fit a corresponding screw-threaded portion of the counterbore in the body stopping short of the bore to the branch pipe receiving portion, the end of the plug remote from the saddle being provided with holes or slots for engagement by a spanner or key for rotating the plug.

The branch pipe receiving portion is preferably a tubular socket coaxial with the bore from the counterbore, into which socket a branch pipe can be fitted and sealed by any suitable means, such as a sealing ring or adhesive sealant, or, if the branch pipe is of plastics material too it can be secured in the socket by heat fusion or solvent cement welding.

Likewise, the saddle can be heat fusion or solvent cement welded to the plastics pipe to be tapped. However, a sealing ring may be provided, alternatively, for effecting sealing between the saddle and the exterior of a plastics pipe to be tapped, the saddle then being clamped to the pipe, as by means on a complementary saddle on the opposite side of the pipe and interengaging clamps or bolts or straps.

One appreciable advantage of the invention is that for a given size of saddle and branch pipe therefrom, the hole cut in the plastics pipe is comparatively small, so that the plastics pipe is not seriously weakened.

A preferred embodiment will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a section of a tapping tee according to the invention taken from the common plane through the axes of the bore;

Figure 2 corresponds to Figure 1 but shows the tee during the course of tapping a plastics pipe for the connection thereto of a plastics branch pipe, and

Figure 3 corresponds to Figure 2 but shows the tee upon completion of the tapping operation.

In the Figures, a tapping tee comprises a saddle 1 integral with a body 2 and a branch pipe receiving socket 3 of plastics material, e.g., polyethylene, with a bore 4 through the saddle to a counterbore 5 through the body and a bore 6 to the socket 3 from the counterbore 5. A plug 7 of plastics material, again, e.g., polyethylene, is externally screw-threaded to fit in a correspondingly screw-threaded portion 8 of the counterbore stopping short of the bore 6 to the socket 3, with holes 9 in the end of the plug remote from the saddle for engagement by a spanner or key (not shown) for rotating the plug. An axial bore 10 through the plug 7 has a screw-threaded counterbore 11 at the end towards the saddle.

A tubular friction cutter 12 has an external diameter slightly less than the diameter of the bore 4, the cutter being carried coaxially on one side of a disc 13 having a diameter slightly less than the diameter of the counterbore 5, and a spigot 14 extending coaxially from the other side of the disc, the spigot being screw-threaded to correspond with the screw-threaded counterbore 11 in the plug 7, and encircled by a sealing ring or washer 15, and the spigot also being provided with a non-circular (e.g. hexagonal) socket 16 for engagement by a suitable disengageable tool (one being shown in Figure 2) capable of extending through the bore 10 in the plug. A plastics cap 17 (Figures 1 and 3) is adapted to be screwed on to external screw-threading 18 on the body 2 to compress a sealing ring 19 into sealing engagement with the inside of the cap and the end 20 of the body remote from the saddle 1 (see especially Figure 3).

As shown in Figures 2 and 3, a plastics branch pipe 21 is secured in the socket 3, as by heat fusion welding, and the saddle 1 is secured (again, as by heat fusion welding) to a plastics pipe 22 to be tapped while under pressure of, e.g. gas and connected to the branch pipe. The cap 17 (and the sealing ring 19) is removed, as shown in Figure 2, so that a spindle 23 — which together with a wrench (not shown) is well-known as part of a socket spanner kit — can be passed through the bore 10 in the plug and one non-circular end 24 engaged with the socket 16 in the spigot 14 of the cutter, that end 24 of the spindle having a protruding ball 25 to effect a frictional gripping engagement in the socket 16. The other non-circular end 26 of the spindle stands clear of the body 2 for engagement by a wrench or brace (not shown) so that the cutter 12 can be rotated to cut through the pipe before the disc 13 encounters the shoulder 27 between the counterbore 5 and the bore 4, the portion 28 of pipe removed being retained inside the cutter 12.

The cutter is then lifted by the spindle 23 and rotated appropriately for the spigot 14 to screw into the counterbore 11 in the plug 7, so that after disengagement of the spindle the cutter is held clear of the hole 29 in the pipe 22 and the bore 4 in the saddle (as shown in Figure 3), and gas from within the pipe 22 flows through the hole 29, the bore 4, the counterbore 5, and the bore 6 to the branch pipe 21. The spigot 14 on the cutter 12, now being screwed into the counterbore 11 in the plug, affords at least a substantial closing of the bore 10 in the plug against escape of gas, assisted by the sealing ring or washer 15, but replacement of the cap 17 and sealing ring 19 (as also shown in Figure 3) ensures a gas tight joint thereafter, yet leaving it possible to gain access, e.g., should it be required that the cutter 12 be advanced into sealing engagement with the hole 29 in the pipe 22 to cut off

the gas to the branch pipe 21 while work is carried out in the branch pipeline, without interrupting the flow in the tapped pipe.

WHAT WE CLAIM IS:—

5 1. A tapping tee for a plastics pipe comprising a saddle adapted for sealing engagement with the exterior of a plastics pipe, a body integral with the saddle, with a bore through the saddle to a counterbore through the body, 10 a branch pipe receiving portion integral with the body adjacent the saddle, with a bore to the branch pipe receiving portion from the counterbore in the body, and a plug secured in the counterbore in the body between the bore to the branch pipe receiving portion and the end of the body remote from the saddle, the body and its integral parts and the plug being formed of plastics material, and the plug being provided with an axial bore with a screw-threaded counterbore at the end towards 15 the saddle, together with a tubular friction cutter adapted to retain within itself a portion of pipe removed by it and having an external diameter slightly less than the diameter of the bore in the saddle, the cutter being carried 20 coaxially on one side of a disc having a diameter slightly less than the diameter of the counterbore in the body and a spigot extending coaxially from the other side of the disc, the 25 spigot being screw-threaded to correspond with the screw-threaded counterbore in the plug, and the spigot also being provided with means for enabling it to be rotated by a suitable disengageable tool capable of extending 30

through the bore in the plug. 35

2. A tapping tee as in Claim 1, wherein the end of the body remote from the saddle is provided with external screw-threading for a cap. 40

3. A tapping tee as in Claim 2, wherein a sealing ring is provided for compression between the inside of the cap and the end of the body. 45

4. A tapping tee as in any one of Claims 1 to 3, wherein the spigot is provided with a non-circular socket. 50

5. A tapping tee as in any one of Claims 1 to 4, wherein the plug is externally screw-threaded to fit a corresponding screw-threaded portion of the counterbore in the body stopping short of the bore to the branch pipe receiving portion, the end of the plug remote from the saddle being provided with holes or slots for engagement by a spanner or key for rotating the plug. 55

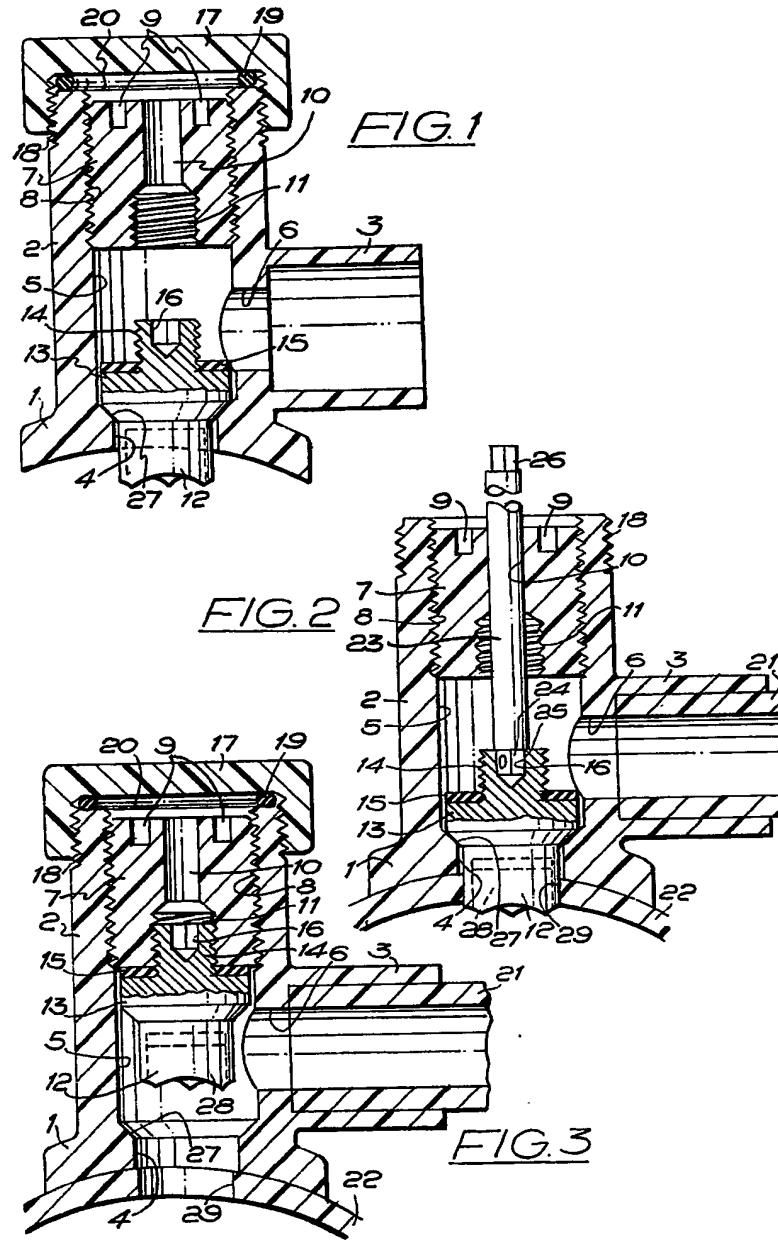
6. A tapping tee as in any one of Claims 1 to 5, wherein the branch receiving portion is a tubular socket coaxial with the bore from the counterbore. 60

7. A tapping tee for a plastics pipe substantially as hereinbefore described with reference to the accompanying drawings.

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